

Claims

Subj 1) 1. A separator for use in an alkaline zinc alkaline
battery comprising
5 a cellulose film regenerated from a solution of
cellulose, said cellulose having hydrocarbon cross-links
containing 4 to 16 carbon atoms.

2. A separator according to claim 1 in which the
cross-links are attached to hydroxyl sites on the
10 cellulose.

3. A separator according to claim 2 in which 0.5% to
15 10% of the available hydroxyl sites contain said cross-
links.

4. A separator according to claim 3 in which the
15 cross-linking agent is an alkylene chain containing 4 to 12
carbon atoms.

5. A separator according to claim 1 in which the
cellulose is selected from the group consisting of
20 microgranular cellulose, cotton fiber, paper and
microcrystalline cellulose.

6. A zinc alkaline battery comprising in combination:
an alkali resistant battery case;
a body of alkaline electrolyte;
a zinc electrode having a portion thereof in contact
25 with said body of electrolyte;
a counter electrode having a portion thereof in
contact with said body of electrolyte; and
a cellulose separator disposed between said electrodes
having no more than 10% of hydroxyl sites on cellulose
30 chains cross-linked with a hydrocarbon group containing 4
to 16 carbon atoms.

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7. A battery according to claim 6 in which the hydrocarbon group is an alkylene group containing 6 to 12 carbon atoms.

8. A battery according to claim 7 in which the cellulose is selected from the group consisting of microcrystalline cellulose, microgranular cellulose, cotton fiber and paper.

9. A battery according to claim 7 in which the counter electrode comprises silver.

10. A method of forming a separator for an alkaline zinc alkaline battery comprising the steps of:

 dissolving cellulose in an organic solvent to form a solution;

15 deprotonizing from 0.5% to 10% of hydroxyl groups on the cellulose;

 adding a hydrocarbon polyhalide containing 4 to 16 carbon atoms to the solution and reacting the halide atoms with the deprotonizing sites to form cross-links;

20 forming a film of said solution containing cross-linked cellulose; and

 drying the film to form a separator.

11. A method according to claim 10 in which the separator has a thickness from 10 microns to 250 microns.

12. A method according to claim 11 in which the cellulose is selected from the group consisting of microgranular cellulose, cotton fiber, paper and microcrystalline cellulose.

13. A method according to claim 12 in which the cellulose has a degree of polymerization from 200 to 1200.

30 14. A method according to claim 10 in which substantially all the deprotonized sites are reacted with cross-linking agent.

15. A method according to claim 10 in which the halide is an iodide,

16. A method according to claim 10 in which the solvent comprises a polar aprotic solvent and an alkali metal salt.

17. A method according to claim 16 in which the 3 to 8% by weight of the alkali metal salt is present based on weight of polar aprotic solvent.

18. A method according to claim 17 in which the metal
10 salt is lithium chloride and the polar aprotic solvent is
DMAC.

19. A method according to claim 16 in which the solvent is present in the solution in an amount of 1 to 11% by weight.

15 20. A method according to claim 10 in which the
cellulose is deprotonized by adding an inorganic base to
the solution.